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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,263	08/27/2003	Franz J. Baudenbacher	9129-111	6590
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DUCKOR SPRADLING METZGER 401 WEST A STREET, SUITE 2400 SAN DIEGO, CA 92101-7915			WHITTINGTON, KENNETH	
			ART UNIT	PAPER NUMBER
			2862	

DATE MAILED: 12/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/650,263

Applicant(s)

BAUDENBACHER ET AL.

Examiner

Kenneth J Whittington

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>5/11/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

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DETAILED ACTION

Prior Art References

1. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide information that the examiner has determined is reasonably necessary to the examination of this application. In response to this requirement, please provide a copy of each of the art references/articles referred to in the Disclosure from pages 1-4 and any other references referred to throughout the remainder of the Disclosure.

In responding to those requirements that require copies of documents, where the document is a bound text or a single article over 50 pages, the requirement may be met by providing copies of those pages that provide the particular subject matter indicated in the requirement, or where such subject matter is not indicated, the subject matter found in applicant's disclosure.

This requirement is an attachment of this Office action. A complete reply to this Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the Office action.

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Information Disclosure Statement

2. The listing of references in the specification, particularly those references noted above, is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

In addition to the requirement of copies of the references noted above, Applicant is also requested to concurrently file a Form 1449 citing those references therein.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

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The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because line 1 contains words that are implied, namely "are disclosed". Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities:

on page 12, last line, the sentence is missing a term rendering it unclear;

there is no Brief Drawing Description for FIGS. 2a and 2b;

on page 32, paragraph 00128, "FIG. 12(a)" should be "FIG. 11(a)" and "FIG. 12(b)" should be "FIG. 11(b)";

on page 32, paragraph 00129, "FIG. 13" should be "FIG. 12";

on page 32, paragraph 00130, "FIG. 14" should be "FIG. 13";

Appropriate correction is required.

Drawings

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following

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reference sign(s) mentioned in the description: cold plate 52 in Paragraph 0089 and motor 87 in paragraph 00105.

7. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

8. Claim 6 is objected to because of the following informalities: "the thick window" lacks antecedent basis. Appropriate correction is required.

For purposes of examination and in view of the specification, this term is interpreted to mean the truck window referred to in claim 2. Thus, claim 6 is also assumed to depend

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from claim 2 rather than claim 1. If otherwise, please so advise.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1-7, 11, 12, 17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood et al. (US 5,894,220), hereinafter Wellstood I, in view of Wellstood et al. (US 6,516,281), hereinafter Wellstood II. With regard to claim

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1, Wellstood I teaches an apparatus for microscopic imaging of a sample, comprising:

a SQUID evacuated dewar (See Wellstood I FIG. 1a, item 15);

a SQUID sensor cooperating with the dewar to sense magnetic flux from the sample being imaged, said sensor having a detection coil (See Wellstood I FIGS. 2, 3a, 3b and 4a-c, SQUID chip 72 with sensor 70 being a negative feedback loop or flux-locked loop and note electronics in FIG. 6);

said dewar having a thin window (See Wellstood I FIG. 2, item 28); and

a mechanism for mounting the detection coil in close proximity to the thin window (See Wellstood I FIGS. 1a and 1b).

However, Wellstood I does not explicitly disclose a shield as outlined in the claim. Wellstood II teaches a radiation shield mounted within the dewar and having an extension surrounding a detection means in a microscopic imaging means (See Wellstood II FIG. 2, item 213). It would have been obvious to use the radiation shield in the apparatus of Wellstood I. One having ordinary skill in the art would have been motivated to do so to prevent thermal radiation from thermally loading the cold finger of the imaging apparatus (See Wellstood II, col. 5, lines 4-6), which is maintained at temperatures of 3-10K or

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alternatively at 70-80K (See Wellstood II col. 4, lines 47-55 and col. 9, lines 8-12).

Regarding claim 2, Wellstood I teaches a truck backing window overlying the thin window on the vacuum side thereof (See Wellstood I FIG. 2, item 32).

Regarding claim 3, Wellstood I teaches the backing window including a hole therein for receiving the detection coil and the distal end of the shield extension (See Wellstood I FIG. 2, item 32).

Regarding claim 4, Wellstood II teaches the shield being conical and the window hole is tapered (See Wellstood II FIG. 2, item 213).

Regarding claim 5, Wellstood I teaches the window being composed of sapphire material (See Wellstood I col. 6, lines 35-67).

Regarding claim 6 as interpreted in light of the objections noted above, Wellstood I teaches the truck window is composed of sapphire material (See Wellstood I col. 7, lines 1-11).

Regarding claim 7, Wellstood I teaches a positioning mechanism for moving the detection coil adjustably toward and away from the thin window along a substantially straight path of travel (see Wellstood I FIGS. 1a and 1b, note positioning components).

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Regarding claim 11, Wellstood I teaches the detection coil being an all-thin film SQUID magnetometer (See Wellstood I FIG. 2, item 72 and col. 5, line 56 to col. 6, line 29).

Regarding claim 12, Wellstood II teaches the detection coil being a magnetometer coil connected to a SQUID sensor (See Wellstood I FIG. 2, item 72 and col. 5, line 56 to col. 6, line 29).

Regarding claim 17, Wellstood I teaches the detection coil being a gradiometer (See Wellstood I FIG. 2, item 72 and col. 5, line 56 to col. 6, line 29).

Regarding claim 19, Wellstood I teaches a method for microscopic imaging of a sample comprising:

sensing magnetic flux from the sample using a SQUID evacuated dewar and a SQUID sensor having a detection coil and mounting the detection coil in close proximity to a thin window forming a part of the dewar (See Wellstood I FIGS. 1a, 2, 3a, 3b and 4a-c, using dewar item 15 and SQUID chip 72 with sensor 70 being a negative feedback loop or flux-locked loop and note electronics in FIG. 6).

However, Wellstood I does not explicitly teach of mounting a radiation shield. Wellstood II teaches mounting a radiation mounted within the dewar and having an extension surrounding a detection means in a microscopic imaging means (See Wellstood II

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FIG. 2, item 213). It would have been obvious to use the radiation shield in the apparatus of Wellstood I. One having ordinary skill in the art would have been motivated to do so to prevent thermal radiation from thermally loading the cold finger of the imaging apparatus (See Wellstood II, col. 5, lines 4-6), which is maintained at temperatures of 3-10K or alternatively at 70-80K (See Wellstood II col. 4, lines 47-55 and col. 9, lines 8-12).

Regarding claim 20, Wellstood I teaches of replacing the SQUID sensor with other types of cryogenic sensors or multiple SQUID sensors, each having a detection coil (See Wellstood I col. 12, lines 20-25).

Regarding claim 21, Wellstood I teaches applying a magnetic field to the sample being imaged prior to or during said sensing (See Wellstood I col. 6, lines 30-34).

11. Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claims 1 and 7 above, and further in view of Wellstood et al. (US 5,491,411), hereinafter Wellstood III. Regarding claim 8; Wellstood I and Wellstood II teach each and every limitation of claims 1 and 7 as noted above. However, this combination does not explicitly disclose a lever in the

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apparatus. Wellstood III teaches of a lever used in the positioning apparatus of a SQUID apparatus (See Wellstood III FIGS. 4A-4C). It would have been obvious to use the lever assembly of Wellstood III in the apparatus of Wellstood I in view of Wellstood II. One having ordinary skill in the art would have been motivated to do so to allow for adjustment between the samples and the sensor (See Wellstood III col. 9, line 56 to col. 10, line 7).

Regarding claim 10, Wellstood I and Wellstood II teach each and every limitation of claim 1 as noted above. However, this combination does not explicitly disclose the particular coil arrangement. Wellstood III teaches of a bare SQUID magnetometer (See Wellstood III FIGS. 2A and 2B and col. 2, lines 52-65). It would have been obvious to use the bare SQUID of Wellstood III in the apparatus of Wellstood I in view of Wellstood II. One having ordinary skill in the art would have been motivated to do so to allow for the SQUID apparatus to resolve very small features (See Wellstood III col. 2, lines 52-65).

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II and Wellstood III as applied to claims 1, 7 and 8 above, and further in view of Sapir (US 2004/0007004). Wellstood I in view of

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Wellstood II and Wellstood III teach each and every limitation of claims 1, 7 and 8 as noted above. However, this combination does not explicitly disclose the use of a flexure bearing.

Sapir teaches of a flexure bearing used in the positioning apparatus of a shaft in a cryogenic apparatus (See Sapir FIG. 2, note flexure bearing 25 and shaft 30). It would have been obvious to use the flexure bearing of Sapir in the apparatus of Wellstood I in view of Wellstood II and Wellstood III. One having ordinary skill in the art would have been motivated to do to provide precision alignment of the SQUID sensor of the Wellstoods (I, II and III) along its desired longitudinal axis while maintaining radial rigidity with respect to undesired motion (See Sapir, page 3, paragraph 0031).

13. Claims 13, 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claim 1 above, and further in view of Marooka et al. (US 5,825,183). Regarding claims 13 and 14, Wellstood I and Wellstood II teach each and every limitation of claim 1 as noted above. However, this combination does not explicitly disclose the particular coil arrangement used in the apparatus. Marooka et al. teaches of an asymmetrical and first differential coil for use in a SQUID apparatus (See Marooka et al. FIG. 12). It

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would have been obvious to use the coil design as taught by Marooka in the apparatus as taught by Wellstood I and Wellstood II. One having ordinary skill in the art would have been motivated to do so to eliminate ambient and background in the sensor (See Marooka et al. col. 1, lines 48-50).

Regarding claim 18, Wellstood I and Wellstood II teach each and every limitation of claim 1 as noted above. However, this combination does not explicitly disclose the particular coil arrangement used in the apparatus. Marooka et al. teaches of a fractional turn coil for a SQUID apparatus (See Marooka et al. FIG. 2). It would have been obvious to use the fractional turn coil in the apparatus of Wellstood I in view of Wellstood II. One having ordinary skill in the art would have been motivated to do so to reduce the self inductance that accompanies full circumferential coils (See Marooka et al. col. 4, lines 14-32).

14. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claim 1 above, and further in view of Wikswo, Jr. et al. (US 5,038,104). Regarding claim 15, Wellstood I and Wellstood II teach each and every limitation of claim 1 as noted above. However, this combination does not explicitly disclose the particular coil arrangement used in the apparatus. Wikswo Jr.

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et al. teaches of an apodized coil design for a SQUID apparatus (See Wikswo Jr. et al. FIGS. 2D-F). It would have been obvious to use an apodized coil in the apparatus of Wellstood I in view of Wellstood II. One having ordinary skill in the art would have been motivated to do so to provide a coil arrangement for a SQUID apparatus which generates improved current density images while using a magnetometer pickup coil with an improved signal-to-noise ratio, the coil having a reduced size with the number turns increased without a large increase in coil inductance (See Wikswo, Jr. et al. col. 2, lines 18-48).

15. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wellstood I in view of Wellstood II as applied to claim 1 above, and further in view of Tsukada et al. (US 6,424,853). Regarding claim 16, Wellstood I and Wellstood II teach each and every limitation of claim 1 as noted above. However, this combination does not explicitly disclose the particular coil arrangement used in the apparatus. Tsukada et al. teaches of a vector magnetometer for a SQUID apparatus (See Tsukada et al. FIG. 2). It would have been obvious to use a vector magnetometer in the apparatus of Wellstood I in view of Wellstood II. One having ordinary skill in the art would have been motivated to do so to measure the magnetic fields in three

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directions to create a three dimensional view of the object to be measured even when the object has moved (See Tsukada et al. col. 2, lines 39-65).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamaguchi et al. (US 5,884,485) teaches of a heat shield design. Saho et al. (US 6,563,312) teaches of elongated portions in a heat shield to prevent eddy currents. Miller, Jr. et al. (US 5,326,986) teaches of alternate coil designs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J Whittington whose telephone number is (571) 272-2264. The examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (571) 272-2233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kenneth J Whittington
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